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ABSTRACT

Current conditions suggest that there will be an increased emphasis on customizing curricula to focus on the technological skills needed by workers to remain competitive. If community colleges are to continue as leaders in customizing training programs, they must consider ways to convince business and industry clients that up-to-date training programs making use of the latest concepts, theories, and practices can be developed in a timely manner. The concept of the virtual curriculum (VC) offers an alternative to traditional course development. With the VC, instead of diagnosing needs and developing responses that may take several weeks, business and industry clients are presented with a repository of course content through a computer database in a matter of minutes. Application software permits content in college credit courses to be aggregated and moved to a new configuration in a credit or non-credit arrangement to quickly prepare a syllabus that satisfies client needs. In addition to creating a responsive instructional culture at community colleges, benefits of the VC include the cooperation of industry executives and faculty in curriculum design teams, the ability to instantly create a course syllabus based on client needs, reduced staff time on course development, mutual dependency between industry and the college on subject matter exchange, and improved college-industry relations. Contains 12 references. (BCY)

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THE VIRTUAL CURRICULUM:

COMPUTER-ASSISTED CURRICULUM DEVELOPMENT

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The Virtual Curriculum: Computer-Assisted Curriculum Development

ABSTRACT

The future emphasis of curriculum development supports customizing courses that focus on the technological skills needed by workers to remain competitive. To remain responsive and to continue as leaders in customizing training programs, community colleges must consider ways to convince business and industry clients that they are worthy of establishing current training programs with the latest concepts, theories and practices. Traditional methods of course development will not suffice. As community colleges become more involved with workforce development, ways to responsively respond to client needs are essential.

The concept of the Virtual Curriculum offers an alternative to traditional course development. Instead of diagnosing needs and developing a response that takes time, business and industry clients are exposed to the repository of course content through a computer database in a matter of minutes. Application software permits content in college credit courses to be aggregated and moved to a new configuration in a credit or credit-free arrangement to satisfy client needs instantly. The limitless benefits of the Virtual Curriculum are presented as a technique for creating a responsive instructional culture at community colleges. Several benefits of the Virtual Curriculum include: (a) industry executives and faculty as design teams, (b) an instantly created product based on client needs, (c) reduced staff time in course development, (d) mutual dependency on subject matter exchange, and (e) improved college-industry relations.

The Virtual Curriculum:
Computer-Assisted Curriculum Development

Introduction

Content-based curriculum development is one area of constant involvement and change for institutions involved in technology education. Community colleges are well known and highly regarded for their responsive work with business and industry by providing a variety of credit and credit-free courses and programs. Current indications suggest that an increased emphasis in curriculum development will occur in customized courses which principally focus on the technological skills needed by workers to remain competitive. Some practitioners involved in customized course development estimate that 90 percent of the content needed by business and industry in training programs already exists in the college's credit curriculum. To remain responsive and to continue as leaders in customizing training programs, community colleges must consider ways to convince business and industry clients that they are worthy of establishing current training programs with the latest concepts, theories and practices.

The traditional method of course development will not suffice. Unfortunately, it takes considerable time to produce a customized course for business and industry. Several meetings typically occur before the college is able to deliver a workable outline to the client. As community colleges become more involved with workforce development, ways to responsively respond to client needs are essential.

The concept of the Virtual Curriculum offers an alternative to traditional course development. It extends traditional course development through computer technology. Instead of diagnosing needs and developing a response that may take several weeks, business and industry clients are exposed to the repository of course content through a computer database in a matter of minutes. The technology can be exported from the college via modem or made portable through a laptop computer. Presentations can occur on-site through computer monitors, data displays or hard printed copies. Application software permits content in college credit courses to be aggregated and moved to a new configuration in a credit or credit-free arrangement to satisfy client needs instantly.

The Virtual Concept

Corporate executives are familiar with virtual technology. Virtual is a term used in the electronics industry to signify an entity or experience that perpetually adapts to the needs of the user. The word "virtual" in modern discourse is mostly associated with virtual reality, the electronic construction of images that are indisguiseable from the nominal realities they purport to represent (Sorkin, 1992). Virtual technology surrounds us. Since 1990, the word "virtual" in the literature appears in many forms. Among some of the more common usages of "virtual" are virtual corporation, virtual teams, and virtual workplace. "Virtual" is also used with employee, village, community, and city. More

closely aligned with education one finds "virtual" combined with other words, such as classroom, library, and textbooks. There are probably dozens of other uses or applications.

This paper centers around the concept of the Virtual Curriculum (VC). We believe if community colleges are to provide workforce preparation and training to create a world-class workforce, they need a response in concert with the culture of current industry trends and discourse. VC purports the benefits of the total quality management (TQM) movement in higher education. TQM principles surround community college operations and align them with the modern corporate culture. For practical purposes, VC provides a model on which to pattern and guide course development efforts to ensure responsiveness.

The VC concept is offered as a systematic concept on which to foster better workforce/community college relations with an emphasis on customer service in contract training situations. This paper examines: (a) VC as a virtual product of the community college, (b) PEAKS software as a model that facilitates the virtual product, and (c) the practical advantages for using virtual technology.

Curriculum as the Virtual Product

If one assumes the product of a educational institution to be the curriculum, a fundamental question needs asking. Can the curriculum be "virtualized"? To be virtual, a product is available at any time, in any place, and in any variety (Davidow and Malone

(1992). In their book, Davidow and Malone provide examples of familiar, virtual products. For example, prescription eyeglasses are ground and placed in frames within 60 minutes through firms like Lenscrafters and Pearle. Polaroid gave us instant photography years ago. Camcorders create instant movies. Personal computers and laser printers make instant desktop publishing a possible reality in millions of firms and homes. Instant services are available too: oil changes now take only 10 minutes; cash is obtained instantly at ATM's; travel reservations are made instantly; and facsimile reproduction, or fax, provides instant correspondence around the globe. Davidow and Malone (1992) claimed the common thread among all these products is that they produce instant customer gratification in a cost-effective way. These are virtual products. They are produced instantaneously and customized in response to customer demand.

The output of a development process intended for student use is the curriculum (Schiro, 1978). We view the curriculum as education's product. Whether or not it is a virtual product or has the capacity to be virtual depends on the commitment of the institution to make it virtual. We claim the curriculum, with the right tools, is indeed capable of becoming virtual. In fact, we encourage every community college to position itself to have a curriculum that conforms to Davidow and Malone's definition of virtual.

Davidow and Malone (1992) posit that building a virtual product requires an organization to revise itself, employ more

sophisticated types of information, and master new organizational and production skills. Through revision, what emerges will have little in common with what previously existed.

Creating a Responsive Culture

To capture the attention of business executives in workforce curriculum development, the culture of business and the business environment must be understood. Recently, Hammer and Champy (1993) referred to cultural change as "reengineering". According to Hammer and Champy, reengineering is "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed" (1993, p. 46). The concept of reengineering involves: (a) a process orientation, (b) ambition, (c) rule-breaking, and (d) creative use of information technology.

The enabling role of information technology makes virtualization possible. Hammer and Champy (1993), believed that applying information technology to any reengineering effort requires inductive thinking, or the ability to first recognize a powerful solution and then seek the problems it might solve. These are the problems a company or college doesn't even know it has.

New Approaches to Meet Business and Industry Needs

Although American corporations spent upwards of $43 billion for training in 1989, colleges and universities were involved in

only a small proportion of that training (Wallace, 1991). The vast amount of the training offered in corporations tends to duplicate what is taught on college campuses. Some corporate training programs are so similar to college training programs that they offer academic credit or lead to degrees (Wiggenhorn, 1990). Yet, according to Hodson, Hooks, and Rieble (1992), a limitation of customized labor training is a lack of skill acquisition by participants of training programs. This may be due, in part, to weak educational credentials of in-house trainers. According to Wallace (1991), the business world is beginning to see how limited many of its courses are, and thus seek to establish training programs with broader educational content and multidisciplinary perspectives. The existing college curricula serves as a starting point to developing an integrated approach to training curriculum development. This is one of the features for which VC is best suited.

Today, individuals charged with corporate training perceive their role as transmitting the specific skills needed to accomplish a particular task. Wallace (1991), in examining ways to meet current training needs, recommended integrated approaches for responding to business and industry training needs. The customized approach offered through the VC model blends the depth and breadth of the traditional academic curriculum with specific content needed to accompany specific corporate objectives.

The strength of the VC concept envisions college faculty constructing the basis for content in their discipline areas. It

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recognizes faculty as the vanguards of the curriculum through current development and routine revision activities. The process of curriculum development is an activity grounded in the literature of instructional design, and the faculty exist as a resource for curriculum planning. Typically, college credit programs employ faculty and require them to perform curriculum development functions. A tenet of the VC concept extends curriculum decisions made by the faculty to external clients.

Creating the Virtual Curriculum: Performance Instruction

Community colleges use a normative process when business training needs are met through contract training which stresses responsiveness. Personnel in contract training or continuing education exist to meet client needs through customized approaches to curriculum development. Determining course length, content, cost, etc., are responsibilities of this organizational unit. The process of customizing curricula for business and industry is "virtualized" through the use of specialized software. The features of this software are detailed in this section.

Davidow and Malone (1992) claimed that building virtual products, from the business model, requires a sophisticated information network that gathers data on customer needs and combines it with the newest design methods and computer-integrated production processes. This is precisely what occurs in creating the virtual curriculum. Faculty, linked to an information network,

structure the content in the curriculum. The computer integration occurs through a software suite called PEAKS Performance Instruction. The conceptual model undergirding VC is Vogler's (1991) Performance Instruction. Performance Instruction is the planning, delivery, and evaluation of learning and teaching. It is based upon the Vogler Curriculum-Pedagogy-Assessment (C-P-A) model (Vogler, 1991). The model is the foundation of the expert system for three independent or integrated software packages, known as the PEAKS suite. The functions of the expert system are simply literature-based, approved practices that have been harnessed by the modern technology of a computer. The model works without the software; however, the software guides, monitors and aggregates user decisions. PEAKS software is the key to making the curriculum virtual.

The "virtuality" of the model is its ability to isolate, identify and merge portions of existing content to form a new course specially created for the client. Specific decisions, such as identifying content to be taught, determining how it will be taught, when it will be taught, and how it will be evaluated, are made and documented with the assistance of the software. The system is dynamic by providing the infrastructure to develop functional output: a syllabus, a lesson plan, or an exam. On the other hand, the expert system is passive by providing a prescriptive manuscript that can be accessed by the user. The software flexibility is enhanced by allowing the user to override default-based decisions.

The curriculum development or planning phase of Performance Instruction requires that what is to be learned and taught in a course be communicated in advance. The output of planning is a course syllabus with eight distinct elements including a header, course description, course focus, course content goals, student contributions, evaluation, schedule and performance objectives. This output is essential to the virtual curriculum, as it is the document that is shared with business and industry executives.

Virtual Customizing

The syllabus is the virtual creation or document given to the client at the conclusion of a visit by college staff. Here, we assume the client wanted the college to customize a course in response to a training need. The syllabus is created in a matter of minutes, following a brief on-site, needs assessment that includes a participatory review of existing curricula.

The virtual process uses faculty decisions coded through principles of Performance Instruction. These coded decisions are shared with the client. Any course created through Performance Instruction becomes part of a huge database. Current workplace courses such as, literacy, TQM, statistical process control (SPC), basic mathematics, blueprint reading, fundamentals of computer-aided design (CAD), robotics, ISO 9000, and self-managed work teams, are popular offerings for business clients. Clients select content from these courses or from a host of other courses. Truly, the entire college curriculum is available for client review.

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The process of customizing a course is easy. College personnel in the contract training division share the curriculum with the client from a huge Performance Instruction database through the aid of a notebook computer. As the client expresses a need, the college representative presents a course. Courses are reviewed and the client decides on the content for the desired customized course. Through Performance Instruction software, it is possible to pool course content from dozens of courses. For example, a client wanting a course in SPC may want to include content from three curriculum areas: fundamentals of math, statistics, and manufacturing. The software highlights course content so that decisions to include or not to include content can be made instantly. The software will merge content with existing content, and move it to a new file. The result is a new, customized course having precisely the desired content displayed for a final review. When it is accepted, a print command will produce a customized syllabus for the client.

Through various decisions involving the integration of content, a customized course planning document, or syllabus, is created in a minimal amount of time. The syllabus is quickly assembled from the work already completed. The header of this document is customized to include the name of the client. The course description may be a replication of the course description in the institutional catalog. The course focus will be created by the client and college representative to garner participant interest. The course goals were already completed. The student

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contributions will include a standard statement including any outside or assignment expectations. The optional course evaluation will be a point-based system linked to individual content goals. The course schedule will automatically indicate the recommended contact hours per week. The performance objectives will be assembled in a separate addendum. These objectives will be a comprehensive presentation that communicates standards for performance and the conditions under which the performance will be evaluated.

Although the developmental order is different from the final output, the computer will align and format the entire syllabus as it should be presented to the students. The user has override privileges to the structure created by the expert system. Additionally, the user can easily tailor the syllabus to meet individual and specific needs through default and editing functions. Accordingly, specific content not covered in the typical college classroom can be added to further customize content and meet client training needs.

By having the documented curriculum in the database to review, and by selecting the content, the customized curriculum becomes a virtual product for the business client. The process is one that will indicate a commitment to responsiveness on the college's part. Additionally, after presenting the vast array of curriculum content through the database, the client may decide to commit to a long-term plan of customized training.

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Summary

The link between occupational training and the skills needed in business is entering a new dimension of human resource development. Aggressive innovations and new ways of delivering a service represent a vital component in the way community colleges operate (Leitzel, 1991). It is indisputable that community colleges will play increasingly important roles in workforce development as their mission and position remain close to community economic development. Internally, instructional partnerships between credit and credit-free instruction are critical to the responsive community college. Fostering alliances with business and industry demands a responsive, innovative culture within the community college.

The benefits of the Virtual Curriculum were presented as a model for maintaining the respect of industry and contributing to economic prosperity through developing a quality workforce. The advantages of VC include: (a) industry executives and faculty as design teams, (b) an instantly created product (course syllabus) based on client needs, (c) reduced staff time in course development, (d) mutual dependency on subject matter exchange, and (e) improved college-industry relations.

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